

MEASUREMENT AND TECHNICAL REPORT

DIRECTED ELECTRONICS INCORPORATED
1 Viper Way
Vista, CA 92081

DATE: 27 April 2005

This Report Concerns:	Original Grant: X	Class II Change:
Equipment Type:		
2 Way LCD Security, Models 489V, 489P, 489X		
Deferred grant requested per 47 CFR 0.457(d)(1)(ii)?	Yes: Defer until:	No: X
Company Name agrees to notify the Commission by:	N/A	
of the intended date of announcement of the product so that the grant can be issued on that date.		
Transition Rules Request per 15.37?	Yes:	No: X*
(*) FCC Part 15, Paragraph(s) 15.209(a), 15231(a), 15231(b), 15231(c)		
Report Prepared by:	TÜV AMERICA, INC 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone: 858 678 1400 Fax: 858 546 0364	

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1.0 GENERAL INFORMATION**1.1 Product Description**

PLEASE COMPLETE THIS DOCUMENT IN FULL, ENTERING N/A IN THE FIELD IS NO APPLICABLE.

Applicant -- NOTE: This information will be input into your test report as shown below

Company: Directed Electronics, Inc.

Address: 1 Viper Way
Vista, CA 92081

Contact: Minas Minassian Position: RF Engineer

Phone: (760) 598-6200 Fax: (760) 598-6400

E-mail Address: minas.minassian@directed.com

General Equipment Description -- NOTE: This information will be input into your test report as shown below.

EUT Description: Hand held keyfob transceiver for car alarm and convenience systems.

EUT Name: 2 Way LCD Security

Model No.: 489V, 489P, 489X Serial No.: --

Product Options: --

Configurations to be tested: 1

EUT Specifications and Requirements

Length 2.51" Width: 1.41" Height: 0.72" Weight: 1.1oz
: _____

Power Requirements

Regulations require testing to be performed at typical power ratings in the countries of intended use. (i.e., European power is typically 230 VAC 50 Hz or 400 VAC 50 Hz, single and three phase, respectively)

Voltage: 1.5V (AAA Battery) (If battery powered, make sure battery life is sufficient to complete testing.)

of Phases: --

Current (Amps/phase(max)): 100mA Current (Amps/phase(nominal)): --

Other: --

Other Special Requirements

--

Typical Installation and/or Operating Environment

(ie. Hospital, Small Business, Industrial/Factory, etc.)

Automotive

EUT Power Cable

☐ Permanent OR ☐ Removable Length (in meters): --
☐ Shielded OR ☐ Unshielded
☒ Not Applicable

EUT Interface Ports and Cables

Interface			Shielding									
	Analog	Digital	Qty	Yes	No					Length (in meters)	Removable	Permanent
Type						Type	Termination	Connector Type	Port Termination			
EXAMPLE:												
RS232	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Foil over braid	Coaxial	Metallized 9-pin D-Sub	Characteristic Impedance	6	<input checked="" type="checkbox"/>	<input type="checkbox"/>
None	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>

EUT Software

Revision Level: --

Description: --

<p>EUT Operating Modes to be Tested -- list the operating modes to be used during test. It is recommended the equipment be tested while operating in a typical operation mode. FCC testing of personal computers and/or peripherals requires that a simple program generate a complete line of upper case H's. Provide a general description of all software, firmware, and PLD algorithms used in the equipment. List all code modules as described above, with the revision level used during testing. Consult with your TÜV Product Service Representative if additional assistance is required.</p>

1. Continuous modulated transmission

<p>EUT System Components -- List and describe all components which are part of the EUT. For FCC testing a minimum configuration is required. (ie. Mouse, Printer, Monitor, External Disk Drive, Motherboard, etc.)</p>

Description	Model #	Serial #	FCC ID #
Keyfob	487V, 487P, 487X	N/A	EZSDEI489

<p>Support Equipment -- List and describe all support equipment which is not part of the EUT. (i.e. peripherals, simulators, etc)</p>

Description	Model #	Serial #	FCC ID #
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Oscillator Frequencies

Frequency	Derived Frequency	Component # / Location	Description of Use
13.56MHz	433.92MHz	--	Transmitter RF carrier
13.2256MHz	423.22MHz	--	Receiver LO
32.76KHz	--	--	Microcontroller

Power Supply			
Manufacturer	Model #	Serial #	Type
--			<input type="checkbox"/> Switched-mode: (Frequency) _____ <input type="checkbox"/> Linear <input type="checkbox"/> Other:

Power Line Filters		
Manufacturer	Model #	Location in EUT
--		

Critical EMI Components (Capacitors, ferrites, etc.)				
Description	Manufacturer	Part # or Value	Qty	Component # / Location
--				

EMC Critical Detail -- Describe other EMC Design details used to reduce high frequency noise.
--

1.2 Related Submittal Grant

None

1.3 Tested System Details

The FCC ID's for all equipment, plus descriptions of all cables used in the tested system are:

None

1.4 Test Methodology

Purpose of Test: To demonstrate compliance with the following tests.

Test Summary					
Test Description	Paragraph Number	Summary of Results			Pass/Fail
		Low Channel	Mid Channel	High Channel	
Radiated Emissions	15.209(a)		-6.4 dB @ 867.84 MHz		Pass
Deactivation	15.231(a)		Active for 2.1 seconds Deactivates immediately		Pass
Field Strength of Emissions	15.231(b)		-1.3 dB @ 433.920 MHz		Pass
Emission Bandwidth	15.231(c)		14.1 kHz		Pass

Testing was performed according to the procedures in FCC/ANSI C63.4 and CSA 108.8-M1983.

1.5 Test Facility

The open area test site and conducted measurement data were tested by:

TÜV AMERICA, INC
10040 Mesa Rim Road
San Diego, CA 92121-2912
Phone: 858 678 1400
Fax: 858 546 0364

The Test Site Data and performance comply with ANSI C63.4 and are registered with the FCC, 7435 Oakland Mills Road, Columbia Maryland 21046. All Measurement Data is acquired according to the content of FCC Measurement Procedure and ANSI C63.4, unless supplemented with additional requirements as noted in the test report.

2.0 SYSTEM TEST CONFIGURATION

2.1 Justification

The EUT was initially tested for FCC emissions in the following configuration:

See Test Setup Photos Exhibit

2.2 EUT Exercise Software

None

2.3 Special Accessories

None

2.4 Equipment Modifications

None

2.5 Configuration of Test System

See Test Setup Photos Exhibit

**3.0 RADIATED EMISSIONS EQUIPMENT/DATA
DEACTIVATION EQUIPMENT/DATA
FIELD STRENGTH OF EMISSIONS EQUIPMENT/DATA
EMISSION BANDWIDTH EQUIPMENT/DATA**

**Test Conditions: RADIATED EMISSIONS EQUIPMENT/DATA: FCC Part 15.209(a)
DEACTIVATION EQUIPMENT/DATA: FCC Part 15.231(a)
FIELD STRENGTH OF EMISSIONS EQUIPMENT/DATA: FCC Part 15.231(b)
EMISSION BANDWIDTH EQUIPMENT/DATA: FCC Part 15.231(c)**

The measurements were performed at the San Diego Testing Facility:

☐ - Test not applicable

■ - Roof (Small Open Area Test Site)

Test Equipment Used:

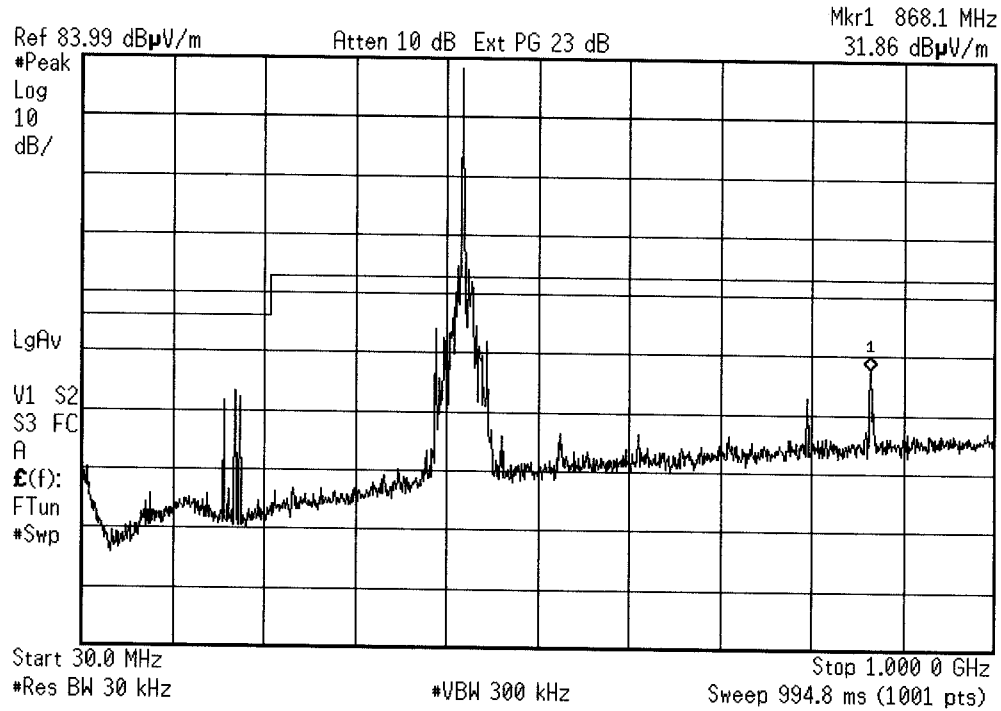
Model No.	Prop. No.	Description	Manufacturer	Serial No.	Date Cal'ed
3146	244	Log Periodic Dipole Antenna	EMCO	1063	07/04
3115	251	Double Ridge Guide Antenna	EMCO	2495	01/05
8566B	744	Spectrum Analyzer	Hewlett Packard	2618A02913	02/05
E4440A	6814	Spectrum Analyzer	Hewlett Packard	MY42510441	12/04
CBL6111	461	Bilog Antenna	Chase Electronics	1291	VBU*

Remarks: One year calibration cycle for all test equipment and sites. (*) Verified Before Use.

FCC Part 15.209(a)

SC502013

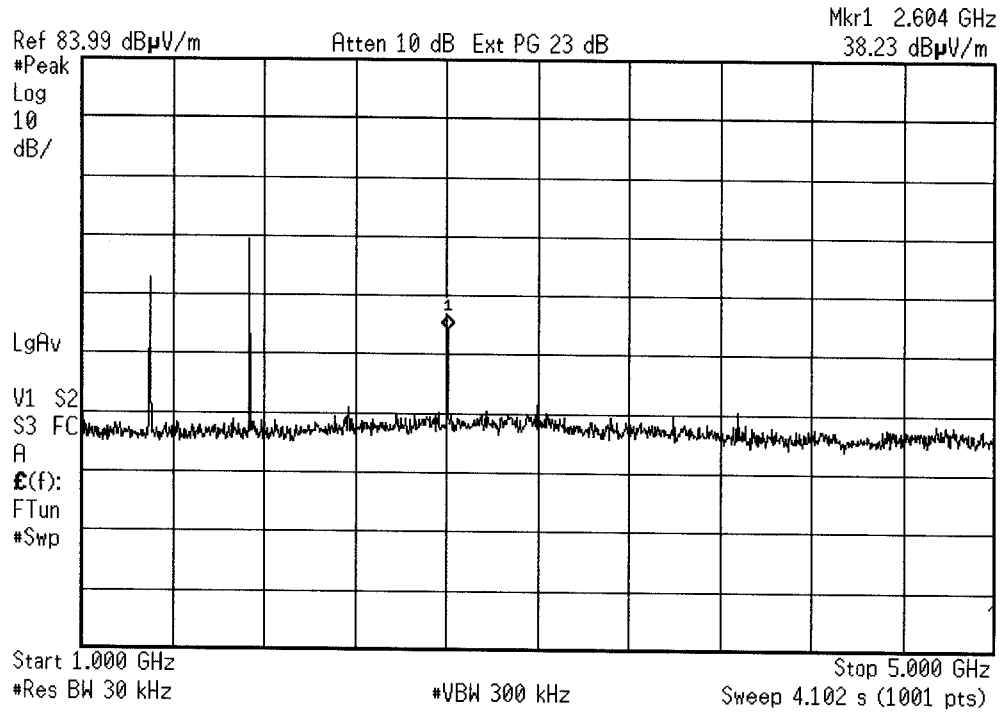
* Agilent 09:34:09 Apr 18, 2005



FCC Part 15.209(a)

SC502013

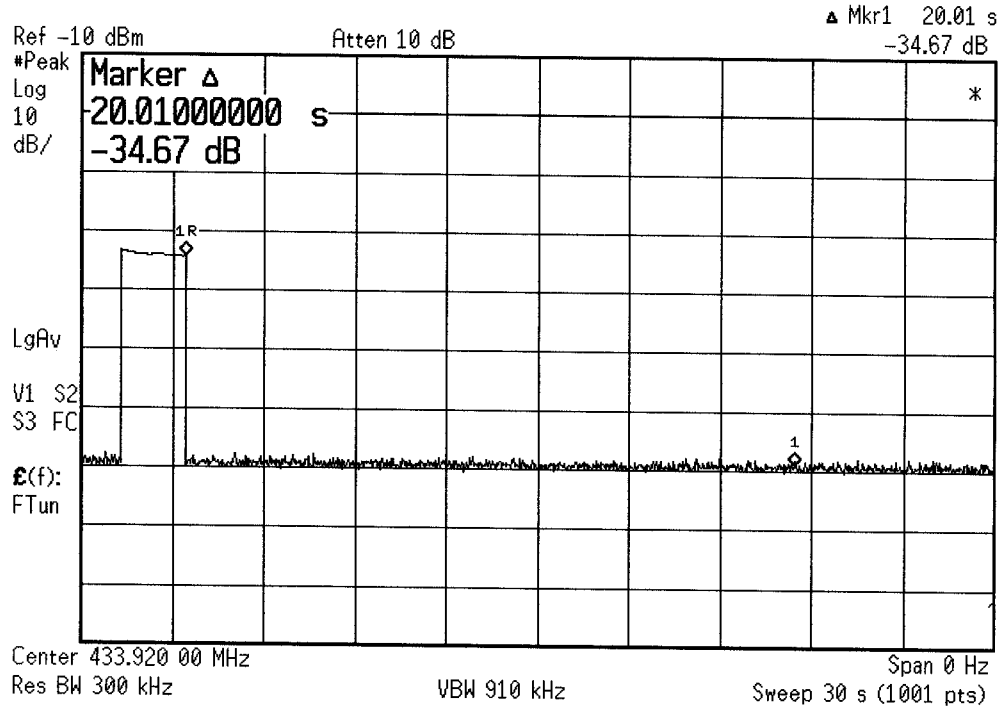
* Agilent 09:38:06 Apr 18, 2005



FCC Part 15.231(a)

✱ Agilent 09:26:33 Apr 18, 2005

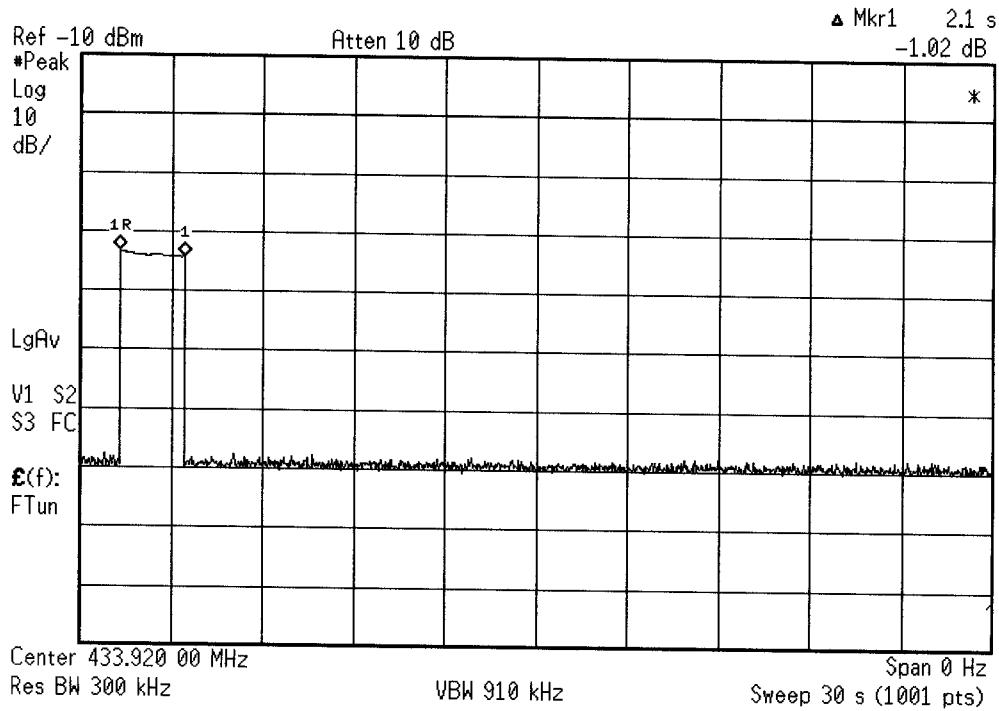
SC 502013



FCC Part 15.231(a)

✱ Agilent 09:28:24 Apr 18, 2005

SC502013



REPORT No: SC502013 TESTER: Frank Harkins SPEC: FCC Part 15 para 15.231(b)

CUSTOMER: Directed Electronics Inc.

TEST DIST: 3 Meters

E U T: 489V/P/X HHU

TEST SITE: Roof

EUT MODE: Transmit 433.92MHz

BICONICAL: N/A

DATE: April 22, 2005

LOG: 244

NOTES: Duty Cycle= 55%

OTHER: 251

above 1GHz: RBW & VBW 1 MHz for Pk; AVG = PK - 20LOG(Duty Cycle)

below 1GHz: RBW & VBW 100 kHz for Pk; AVG = PK - 20LOG(Duty Cycle)

CF = Antenna Factor + Cable Loss - Preamplifier Gain + Preselector Loss

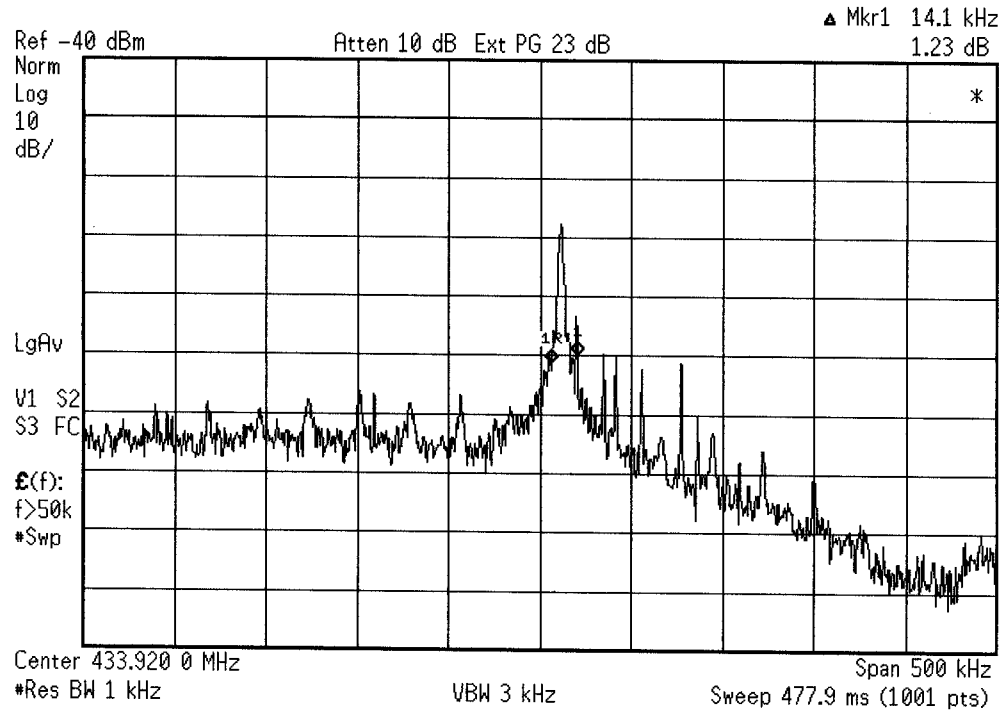
v.beta231

FREQ (MHz)	VERT. (dBuV)		HORIZ (dBuV)		CF (dB/m)	MAX LEVEL (dBuV/m)		SPEC LIMIT (dBuV/m)		MARGIN (dB)		EUT Rotation	Antenna Height
	pk	DCav	pk	DCav		pk	av	pk	av	pk	av		
433.920	57.3	52.0	68.4	63.1	16.4	84.8	79.5	100.8	80.8	-16.0	-1.3		
867.840	37.0	31.7	36.0	30.7	22.7	59.7	54.5	80.8	60.8	-21.1	-6.4	250	2.5
1301.760	64.3	59.0	62.0	56.7	-11.7	52.6	47.3	80.8	60.8	-28.3	-13.5	180	1
1735.680	65.1	59.8	68.0	62.7	-8.7	59.3	54.1	80.8	60.8	-21.5	-6.7		
2169.600	60.0	54.7	62.0	56.7	-6.1	55.9	50.7	80.8	60.8	-24.9	-10.2		
2603.520	57.0	51.7	61.0	55.7	-4.3	56.7	51.4	80.8	60.8	-24.1	-9.4		
3037.440	47.0	41.7	58.0	52.7	-3.1	54.9	49.6	80.8	60.8	-25.9	-11.2		
3471.360	58.2	52.9	58.0	52.7	-1.9	56.3	51.0	80.8	60.8	-24.5	-9.8		
3905.280	58.0	52.7	58.7	53.4	-0.7	58.0	52.7	80.8	60.8	-22.9	-8.1		
4339.200	60.0	54.7	60.6	55.3	-1.0	59.6	54.3	80.8	60.8	-21.3	-6.5		

FCC Part 15.231(c)

* Agilent 09:10:49 Apr 18, 2005

SC 502013



4.0 ATTESTATION STATEMENT

GENERAL REMARKS:

SUMMARY:

All tests were performed per CFR 47, Part(s) **15.209(a), 15231(a), 15231(b), 15231(c)**

■ - Performed

The Equipment Under Test

■ - **Fulfills** the requirements of CFR 47, Part(s) **15.209(a), 15231(a), 15231(b), 15231(c)**

Testing Start Date: 18 April 2005

Testing End Date: 22 April 2005

- TÜV AMERICA, INC. -

Responsible Engineer:



Jim Owen
(EMC Manager)

Responsible Engineer:



Frank Harkins
(EMC Engineer)